Figure 1.

Fusion Proteins that Target Antigen to APC

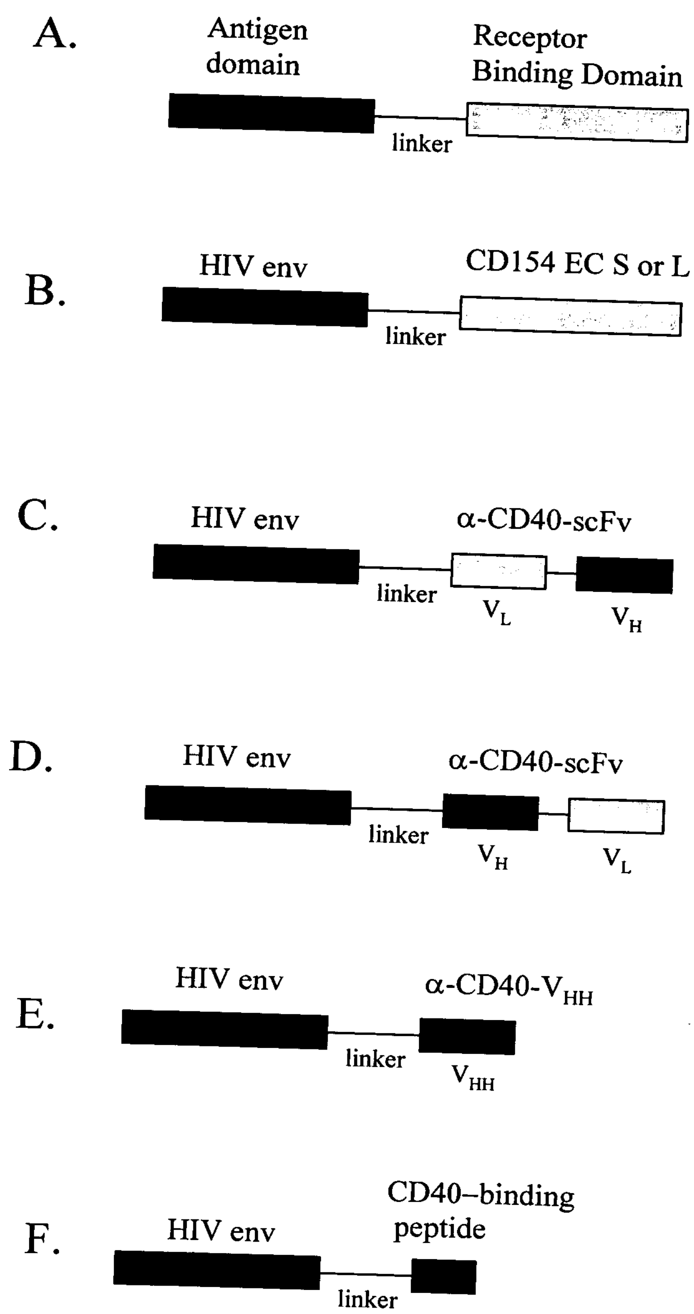

Figure 2A.

Sequence and translation of two cDNAs encoding HIV gp120 V3 loop-CD154 LONG form extracellular domain fusion proteins.

```
        HindIII
        ~~~~~~~~         Signal Peptide
                         Met Leu Tyr Thr Ser Gln Leu Leu Gly Leu Leu
1       AAG CTT GCC GCC ATG CTG TAT ACC TCT CAG CTG TTA GGA CTA CTT
                                     BglII
                                     ~~~~~~~~ HIVgp120-V3 loop
        Leu Phe Trp Ile Ser Ala Ser Arg Ser Val Val Ile Asn Cys Thr
46      CTG TTT TGG ATC TCG GCT TCG AGA TCT GTA GTA ATT AAT TGT ACA
        Arg Pro Asn Asn Asn Thr Arg Arg Arg Leu Ser Ile Gly Pro Gly
91      AGA CCC AAC AAC AAT ACA AGA AGA AGG TTA TCT ATA GGA CCA GGG
        Arg Ala Phe Tyr Ala Arg Arg Asn Ile Ile Gly Asp Ile Arg Gln
136     AGA GCA TTT TAT GCA AGA AGA AAC ATA ATA GGA GAT ATA AGA CAA
        Ala His Cys Asn Ile Ser
181     GCA CAT TGT AAC ATT AGT
        ProAspPro Linker
          BamHI
          ~~~~~~~~
        Pro Asp Pro
199     CCG GAT CCA

        OR (Gly4Ser)3 Linker                                          BamHI
                                                                      ~~~~~~~~
        Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Asp Pro
199     GGT GGC GGT GGC TCA GGA GGC GGT GGA TCT GGC GGT GGA GGT TCG GAT CCA

           CD154 LONG extracellular domain
208PDP     Arg Arg Leu Asp Lys Ile Glu
250GS      AGA AGG TTG GAC AAG ATA GAA
229PDP     Asp Glu Arg Asn Leu His Glu Asp Phe Val Phe Met Lys Thr Ile
271GS      GAT GAA AGG AAT CTT CAT GAA GAT TTT GTA TTC ATG AAA ACG ATA
274PDP     Gln Arg Cys Asn Thr Gly Glu Arg Ser Leu Ser Leu Leu Asn Cys
316GS      CAG AGA TGC AAC ACA GGA GAA AGA TCC TTA TCC TTA CTG AAC TGT
319PDP     Glu Glu Ile Lys Ser Gln Phe Glu Gly Phe Val Lys Asp Ile Met
361GS      GAG GAG ATT AAA AGC CAG TTT GAA GGC TTT GTG AAG GAT ATA ATG
364PDP     Leu Asn Lys Glu Glu Thr Lys Lys Glu Asn Ser Phe Glu Met Gln
406GS      TTA AAC AAA GAG GAG ACG AAG AAA GAA AAC AGC TTT GAA ATG CAA
409PDP     Lys Gly Asp Gln Asn Pro Gln Ile Ala Ala His Val Ile Ser Glu
451GS      AAA GGT GAT CAG AAT CCT CAA ATT GCG GCA CAT GTC ATA AGT GAG
454PDP     Ala Ser Ser Lys Thr Thr Ser Val Leu Gln Trp Ala Glu Lys Gly
496GS      GCC AGC AGT AAA ACA ACA TCT GTG TTA CAG TGG GCT GAA AAA GGA
499PDP     Tyr Tyr Thr Met Ser Asn Asn Leu Val Thr Leu Glu Asn Gly Lys
541GS      TAC TAC ACC ATG AGC AAC AAC TTG GTA ACC CTG GAA AAT GGG AAA
544PDP     Gln Leu Thr Val Lys Arg Gln Gly Leu Tyr Tyr Ile Tyr Ala Gln
586GS      CAG CTG ACC GTT AAA AGA CAA GGA CTC TAT TAT ATC TAT GCC CAA
589PDP     Val Thr Phe Cys Ser Asn Arg Glu Ala Ser Ser Gln Ala Pro Phe
631GS      GTC ACC TTC TGT TCC AAT CGG GAA GCT TCG AGT CAA GCT CCA TTT
634PDP     Ile Ala Ser Leu Cys Leu Lys Ser Pro Gly Arg Phe Glu Arg Ile
676GS      ATA GCC AGC CTC TGC CTA AAG TCC CCC GGT AGA TTC GAG AGA ATC
679PDP     Leu Leu Arg Ala Ala Asn Thr His Ser Ser Ala Lys Pro Cys Gly
721GS      TTA CTC AGA GCT GCA AAT ACC CAC AGT TCC GCC AAA CCT TGC GGG
724PDP     Gln Gln Ser Ile His Leu Gly Gly Val Phe Glu Leu Gln Pro Gly
766GS      CAA CAA TCC ATT CAC TTG GGA GGA GTA TTT GAA TTG CAA CCA GGT
769PDP     Ala Ser Val Phe Val Asn Val Thr Asp Pro Ser Gln Val Ser His
811GS      GCT TCG GTG TTT GTC AAT GTG ACT GAT CCA AGC CAA GTG AGC CAT
814PDP     Gly Thr Gly Phe Thr Ser Phe Gly Leu Leu Lys Leu Glu *** ***
856GS      GGC ACT GGC TTC ACG TCC TTT GGC TTA CTC AAA CTC GAG TGA TAA
           XbaI
859PDP     ~~~~~~~
901GS      TCT AGA
```

Figure 2B.

Sequence and translation of two cDNAs encoding HIV gp120 V3 loop-CD154 SHORT form extracellular domain fusion proteins.

```
      HindIII
      ~~~~~~~~          Signal Peptide
                        Met Leu Tyr Thr Ser Gln Leu Leu Gly Leu Leu
 1    AAG CTT GCC GCC ATG CTG TAT ACC TCT CAG CTG TTA GGA CTA CTT
                                  BglII HIVgp120-V3 loop
                                  ~~~~~~~~
      Leu Phe Trp Ile Ser Ala Ser Arg Ser Val Val Ile Asn Cys Thr
46    CTG TTT TGG ATC TCG GCT TCG AGA TCT GTA GTA ATT AAT TGT ACA
      Arg Pro Asn Asn Asn Thr Arg Arg Arg Leu Ser Ile Gly Pro Gly
91    AGA CCC AAC AAC AAT ACA AGA AGA AGG TTA TCT ATA GGA CCA GGG
      Arg Ala Phe Tyr Ala Arg Arg Asn Ile Ile Gly Asp Ile Arg Gln
136   AGA GCA TTT TAT GCA AGA AGA AAC ATA ATA GGA GAT ATA AGA CAA
      Ala His Cys Asn Ile Ser
181   GCA CAT TGT AAC ATT AGT

      ProAspPro Linker
          BamHI
          ~~~~~~~~
      +-----------+
      | Pro Asp Pro |
199   | CCG GAT CCA |
      +-----------+

      OR (Gly4Ser)3 Linker                                    BamHI
                                                              ~~~~~~~~
  +-------------------------------------------------------------------+
  | Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Asp Pro |
199GGT GGC GGT GGC TCA GGA GGC GGT GGA TCT GGC GGT GGA GGT TCG GAT CCA
  +-------------------------------------------------------------------+

      CD154 SHORT extracellular domain
208PDP  Glu Asn Ser Phe Glu Met Gln
250GS   GAA AAC AGC TTT GAA ATG CAA
229PDP  Lys Gly Asp Gln Asn Pro Gln Ile Ala Ala His Val Ile Ser Glu
271GS   AAA GGT GAT CAG AAT CCT CAA ATT GCG GCA CAT GTC ATA AGT GAG
274PDP  Ala Ser Ser Lys Thr Thr Ser Val Leu Gln Trp Ala Glu Lys Gly
316GS   GCC AGC AGT AAA ACA ACA TCT GTG TTA CAG TGG GCT GAA AAA GGA
319PDP  Tyr Tyr Thr Met Ser Asn Asn Leu Val Thr Leu Glu Asn Gly Lys
361GS   TAC TAC ACC ATG AGC AAC AAC TTG GTA ACC CTG GAA AAT GGG AAA
364PDP  Gln Leu Thr Val Lys Arg Gln Gly Leu Tyr Tyr Ile Tyr Ala Gln
406GS   CAG CTG ACC GTT AAA AGA CAA GGA CTC TAT TAT ATC TAT GCC CAA
409PDP  Val Thr Phe Cys Ser Asn Arg Glu Ala Ser Ser Gln Ala Pro Phe
451GS   GTC ACC TTC TGT TCC AAT CGG GAA GCT TCG AGT CAA GCT CCA TTT
454PDP  Ile Ala Ser Leu Cys Leu Lys Ser Pro Gly Arg Phe Glu Arg Ile
496GS   ATA GCC AGC CTC TGC CTA AAG TCC CCC GGT AGA TTC GAG AGA ATC
499PDP  Leu Leu Arg Ala Ala Asn Thr His Ser Ser Ala Lys Pro Cys Gly
541GS   TTA CTC AGA GCT GCA AAT ACC CAC AGT TCC GCC AAA CCT TGC GGG
544PDP  Gln Gln Ser Ile His Leu Gly Gly Val Phe Glu Leu Gln Pro Gly
586GS   CAA CAA TCC ATT CAC TTG GGA GGA GTA TTT GAA TTG CAA CCA GGT
589PDP  Ala Ser Val Phe Val Asn Val Thr Asp Pro Ser Gln Val Ser His
631GS   GCT TCG GTG TTT GTC AAT GTG ACT GAT CCA AGC CAA GTG AGC CAT
634GS   Gly Thr Gly Phe Thr Ser Phe Gly Leu Leu Lys Leu Glu *** ***
676GS   GGC ACT GGC TTC ACG TCC TTT GGC TTA CTC AAA CTC GAG TGA TAA
        XbaI
        ~~~~~~~
679PDP  Ser Arg
721GS   TCT AGA
```

Figure 3A.

Sequence and translation of two cDNAs encoding HIV gp120-CD154 LONG form extracellular domain fusion proteins.

HindIII
~~~~~~~~

Signal Peptide

```
                    Met Leu Tyr Thr Ser Gln Leu Leu Gly Leu Leu
  1 AAG CTT GCC GCC ATG CTG TAT ACC TCT CAG CTG TTA GGA CTA CTT
                                BglII
                                ~~~~~~~~    HIV gp120 domain
    Leu Phe Trp Ile Ser Ala Ser Arg Ser Met Leu Leu Gly Ile Leu
 46 CTG TTT TGG ATC TCG GCT TCG AGA TCT ATG CTC CTT GGG ATA TTG
    Met Ile Cys Ser Ala Thr Glu Lys Leu Trp Val Thr Val Tyr Tyr
 91 ATG ATC TGT AGT GCT ACA GAA AAA TTG TGG GTC ACA GTC TAT TAT
    Gly Val Pro Val Trp Arg Glu Ala Thr Thr Thr Leu Phe Cys Ala
136 GGG GTA CCT GTG TGG AGA GAA GCA ACC ACC ACT CTA TTT TGT GCA
    Ser Asp Ala Lys Ala Tyr Asp Thr Glu Val His Asn Val Trp Ala
181 TCA GAT GCT AAA GCC TAT GAT ACA GAG GTA CAT AAT GTT TGG GCC
    Thr His Ala Cys Val Pro Thr Asp Pro Asn Pro Gln Glu Val Val
226 ACA CAT GCC TGT GTA CCC ACA GAC CCC AAC CCA CAA GAA GTA GTA
    Leu Gly Asn Val Thr Glu Asn Phe Asn Met Trp Lys Asn Asn Met
271 TTG GGA AAT GTG ACA GAA AAT TTT AAC ATG TGG AAA AAT AAC ATG
    Val Asp Gln Met His Glu Asp Ile Ile Ser Leu Trp Asp Glu Ser
316 GTA GAT CAG ATG CAT GAG GAT ATA ATC AGT TTA TGG GAT GAA AGC
    Leu Lys Pro Cys Val Lys Leu Thr Pro Leu Cys Val Thr Leu Asn
361 CTA AAG CCA TGT GTA AAA TTA ACC CCA CTC TGT GTT ACT TTA AAT
    Cys Thr Asn Leu Asn Ile Thr Lys Asn Thr Thr Asn Pro Thr Ser
406 TGC ACT AAT TTG AAT ATC ACT AAG AAT ACT ACT AAT CCC ACT AGT
    Ser Ser Trp Gly Met Met Glu Lys Gly Glu Ile Lys Asn Cys Ser
451 AGC AGC TGG GGA ATG ATG GAG AAA GGA GAA ATA AAA AAT TGC TCT
    Phe Tyr Ile Thr Thr Ser Ile Arg Asn Lys Val Lys Lys Glu Tyr
496 TTC TAT ATC ACC ACA AGC ATA AGA AAT AAG GTA AAG AAA GAA TAT
    Ala Leu Phe Asn Arg Leu Asp Val Val Pro Ile Glu Asn Thr Asn
541 GCA CTT TTT AAT AGA CTT GAT GTA GTA CCA ATA GAA AAT ACT AAT
    Asn Thr Lys Tyr Arg Leu Ile Ser Cys Asn Thr Ser Val Ile Thr
586 AAT ACT AAG TAT AGG TTA ATA AGT TGT AAC ACC TCA GTC ATT ACA
    Gln Ala Cys Pro Lys Val Ser Phe Gln Pro Ile Pro Ile His Tyr
631 CAG GCC TGT CCA AAG GTA TCC TTT CAG CCA ATT CCC ATA CAT TAT
    Cys Val Pro Ala Gly Phe Ala Met Leu Lys Cys Asn Asn Lys Thr
676 TGT GTC CCG GCT GGG TTT GCG ATG CTA AAG TGT AAC AAT AAG ACA
    Phe Asn Gly Ser Gly Pro Cys Thr Asn Val Ser Thr Val Gln Cys
721 TTC AAT GGA TCA GGA CCA TGC ACA AAT GTC AGC ACA GTA CAA TGT
    Thr His Gly Ile Arg Pro Val Val Ser Thr Gln Leu Leu Leu Asn
766 ACA CAT GGA ATT AGG CCA GTG GTG TCA ACT CAA CTG CTG TTA AAT
    Gly Ser Leu Ala Glu Glu Asp Ile Val Ile Arg Ser Glu Asn Phe
811 GGC AGT CTA GCA GAA GAA GAC ATA GTA ATT AGA TCT GAA AAT TTC
    Thr Asp Asn Ala Lys Thr Ile Ile Val Gln Leu Asn Glu Ser Val
856 ACA GAC AAT GCT AAA ACC ATA ATA GTA CAG CTA AAT GAA TCT GTA
    Val Ile Asn Cys Thr Arg Pro Asn Asn Asn Thr Arg Arg Arg Leu
901 GTA ATT AAT TGT ACA AGA CCC AAC AAC AAT ACA AGA AGA AGG TTA
    Ser Ile Gly Pro Gly Arg Ala Phe Tyr Ala Arg Arg Asn Ile Ile
946 TCT ATA GGA CCA GGG AGA GCA TTT TAT GCA AGA AGA AAC ATA ATA
    Gly Asp Ile Arg Gln Ala His Cys Asn Ile Ser Arg Ala Lys Trp
991 GGA GAT ATA AGA CAA GCA CAT TGT AAC ATT AGT AGA GCA AAA TGG
    Asn Asn Thr Leu Gln Gln Ile Val Ile Lys Leu Arg Glu Lys Phe
1036 AAT AAC ACT TTA CAA CAG ATA GTT ATA AAA TTA AGA GAA AAA TTT
    Arg Asn Lys Thr Ile Ala Phe Asn Gln Ser Ser Gly Gly Asp Pro
1081 AGG AAT AAA ACA ATA GCC TTT AAT CAA TCC TCA GGA GGG GAC CCA
    Glu Ile Val Met His Ser Phe Asn Cys Gly Gly Glu Phe Phe Tyr
1126 GAA ATT GTA ATG CAC AGT TTT AAT TGT GGA GGG GAA TTC TTC TAC
    Cys Asn Thr Ala Gln Leu Phe Asn Ser Thr Trp Asn Val Thr Gly
1171 TGT AAT ACA GCA CAA CTG TTT AAT AGT ACT TGG AAT GTT ACT GGA
    Gly Thr Asn Gly Thr Glu Gly Asn Asp Ile Ile Thr Leu Gln Cys
```
```

**Figure 3A (continued).**
**Sequence and translation of two cDNAs encoding HIV gp120-CD154 LONG form extracellular domain fusion proteins.**

1216 GGG ACA AAT GGC ACT GAA GGA AAT GAC ATA ATC ACA CTC CAA TGC
Arg Ile Lys Gln Ile Ile Asn Met Trp Gln Lys Val Gly Lys Ala
1261 AGA ATA AAA CAA ATT ATA AAT ATG TGG CAG AAA GTA GGA AAA GCA
Met Tyr Ala Pro Pro Ile Thr Gly Gln Ile Arg Cys Ser Ser Asn
1306 ATG TAT GCC CCT CCC ATC ACA GGA CAA ATT AGA TGT TCA TCA AAT
Ile Thr Gly Leu Leu Leu Thr Arg Asp Gly Gly Asn Ser Thr Glu
1351 ATT ACA GGG CTG CTA CTA ACA AGA GAT GGA GGT AAT AGT ACT GAG
Thr Glu Thr Glu Ile Phe Arg Pro Gly Gly Gly Asp Met Arg Asp
1396 ACT GAG ACT GAG ATC TTC AGA CCT GGA GGA GGA GAT ATG AGG GAC
Asn Trp Arg Ser Glu Leu Tyr Lys Tyr Lys Val Val Arg Ile Glu
1441 AAT TGG AGA AGT GAA TTA TAT AAA TAT AAA GTA GTA AGA ATT GAA
Pro Ile Gly Val Ala Pro Thr Arg Ala Lys Arg Arg Thr Val Gln
1486 CCA ATA GGA GTA GCA CCC ACC AGG GCA AAG AGA AGA ACA GTG CAA
Arg Glu Lys Arg
1531 AGA GAA AAA AGA

***(Gly₄Ser)₃ linker***

BamHI
~~~~~~~~~
Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Asp Pro
1543 GGG GGA GGC GGT TCA GGA GGT GGA GGT TCT GGA GGT GGC GGA TC**G GAT CCA**

***OR ProAspPro linker***

BamHI
~~~~~~~~~
Pro Asp Pro
1543 CC**G GAT CCA**

***CD154 LONG FORM Extracellular Domain***

1594GS Arg Arg Leu Asp Lys Ile Glu Asp Glu
1552PDP **AGA** AGG TTG GAC AAG ATA GAA GAT GAA
1621GS Arg Asn Leu His Glu Asp Phe Val Phe Met Lys Thr Ile Gln Arg
1579PDP AGG AAT CTT CAT GAA GAT TTT GTA TTC ATG AAA ACG ATA CAG AGA
1666GS Cys Asn Thr Gly Glu Arg Ser Leu Ser Leu Leu Asn Cys Glu Glu
1624PDP TGC AAC ACA GGA GAA AGA TCC TTA TCC TTA CTG AAC TGT GAG GAG
1711GS Ile Lys Ser Gln Phe Glu Gly Phe Val Lys Asp Ile Met Leu Asn
1669PDP ATT AAA AGC CAG TTT GAA GGC TTT GTG AAG GAT ATA ATG TTA AAC
1756GS Lys Glu Glu Thr Lys Lys Glu Asn Ser Phe Glu Met Gln Lys Gly
1714PDP AAA GAG GAG ACG AAG AAA GAA AAC AGC TTT GAA ATG CAA AAA GGT
1801GS Asp Gln Asn Pro Gln Ile Ala Ala His Val Ile Ser Glu Ala Ser
1759PDP GAT CAG AAT CCT CAA ATT GCG GCA CAT GTC ATA AGT GAG GCC AGC
1846GS Ser Lys Thr Thr Ser Val Leu Gln Trp Ala Glu Lys Gly Tyr Tyr
1804PDP AGT AAA ACA ACA TCT GTG TTA CAG TGG GCT GAA AAA GGA TAC TAC
1891GS Thr Met Ser Asn Asn Leu Val Thr Leu Glu Asn Gly Lys Gln Leu
1849PDP ACC ATG AGC AAC AAC TTG GTA ACC CTG GAA AAT GGG AAA CAG CTG
1936GS Thr Val Lys Arg Gln Gly Leu Tyr Tyr Ile Tyr Ala Gln Val Thr
1894PDP ACC GTT AAA AGA CAA GGA CTC TAT TAT ATC TAT GCC CAA GTC ACC
1981GS Phe Cys Ser Asn Arg Glu Ala Ser Ser Gln Ala Pro Phe Ile Ala
1939PDP TTC TGT TCC AAT CGG GAA GCT TCG AGT CAA GCT CCA TTT ATA GCC
2026GS Ser Leu Cys Leu Lys Ser Pro Gly Arg Phe Glu Arg Ile Leu Leu
1984PDP AGC CTC TGC CTA AAG TCC CCC GGT AGA TTC GAG AGA ATC TTA CTC
2071GS Arg Ala Ala Asn Thr His Ser Ser Ala Lys Pro Cys Gly Gln Gln
2029PDP AGA GCT GCA AAT ACC CAC AGT TCC GCC AAA CCT TGC GGG CAA CAA
2116GS Ser Ile His Leu Gly Gly Val Phe Glu Leu Gln Pro Gly Ala Ser
2074PDP TCC ATT CAC TTG GGA GGA GTA TTT GAA TTG CAA CCA GGT GCT TCG
2161GS Val Phe Val Asn Val Thr Asp Pro Ser Gln Val Ser His Gly Thr
2119PDP GTG TTT GTC AAT GTG ACT GAT CCA AGC CAA GTG AGC CAT GGC ACT

XbaI
2206GS Gly Phe Thr Ser Phe Gly Leu Leu Lys Leu Glu *** *** Ser Arg
2164PDP GGC TTC ACG TCC TTT GGC TTA CTC AAA CTC GAG TGA TAA **TCT AGA**

**Figure 3B.**
**Sequence and translation of two cDNAs encoding HIV gp120-CD154 short form extracellular domain fusion proteins.**

```
       HindIII
       ~~~~~~~~       Signal Peptide
                      Met Leu Tyr Thr Ser Gln Leu Leu Gly Leu Leu
   1   AAG CTT GCC GCC ATG CTG TAT ACC TCT CAG CTG TTA GGA CTA CTT
                                  BglII
                                  ~~~~~~~~    HIV gp120 domain
       Leu Phe Trp Ile Ser Ala Ser Arg Ser Met Leu Leu Gly Ile Leu
  46   CTG TTT TGG ATC TCG GCT TCG AGA TCT ATG CTC CTT GGG ATA TTG
       Met Ile Cys Ser Ala Thr Glu Lys Leu Trp Val Thr Val Tyr Tyr
  91   ATG ATC TGT AGT GCT ACA GAA AAA TTG TGG GTC ACA GTC TAT TAT
       Gly Val Pro Val Trp Arg Glu Ala Thr Thr Thr Leu Phe Cys Ala
 136   GGG GTA CCT GTG TGG AGA GAA GCA ACC ACC ACT CTA TTT TGT GCA
       Ser Asp Ala Lys Ala Tyr Asp Thr Glu Val His Asn Val Trp Ala
 181   TCA GAT GCT AAA GCC TAT GAT ACA GAG GTA CAT AAT GTT TGG GCC
       Thr His Ala Cys Val Pro Thr Asp Pro Asn Pro Gln Glu Val Val
 226   ACA CAT GCC TGT GTA CCC ACA GAC CCC AAC CCA CAA GAA GTA GTA
       Leu Gly Asn Val Thr Glu Asn Phe Asn Met Trp Lys Asn Asn Met
 271   TTG GGA AAT GTG ACA GAA AAT TTT AAC ATG TGG AAA AAT AAC ATG
       Val Asp Gln Met His Glu Asp Ile Ile Ser Leu Trp Asp Glu Ser
 316   GTA GAT CAG ATG CAT GAG GAT ATA ATC AGT TTA TGG GAT GAA AGC
       Leu Lys Pro Cys Val Lys Leu Thr Pro Leu Cys Val Thr Leu Asn
 361   CTA AAG CCA TGT GTA AAA TTA ACC CCA CTC TGT GTT ACT TTA AAT
       Cys Thr Asn Leu Asn Ile Thr Lys Asn Thr Thr Asn Pro Thr Ser
 406   TGC ACT AAT TTG AAT ATC ACT AAG AAT ACT ACT AAT CCC ACT AGT
       Ser Ser Trp Gly Met Met Glu Lys Gly Glu Ile Lys Asn Cys Ser
 451   AGC AGC TGG GGA ATG ATG GAG AAA GGA GAA ATA AAA AAT TGC TCT
       Phe Tyr Ile Thr Thr Ser Ile Arg Asn Lys Val Lys Lys Glu Tyr
 496   TTC TAT ATC ACC ACA AGC ATA AGA AAT AAG GTA AAG AAA GAA TAT
       Ala Leu Phe Asn Arg Leu Asp Val Val Pro Ile Glu Asn Thr Asn
 541   GCA CTT TTT AAT AGA CTT GAT GTA GTA CCA ATA GAA AAT ACT AAT
       Asn Thr Lys Tyr Arg Leu Ile Ser Cys Asn Thr Ser Val Ile Thr
 586   AAT ACT AAG TAT AGG TTA ATA AGT TGT AAC ACC TCA GTC ATT ACA
       Gln Ala Cys Pro Lys Val Ser Phe Gln Pro Ile Pro Ile His Tyr
 631   CAG GCC TGT CCA AAG GTA TCC TTT CAG CCA ATT CCC ATA CAT TAT
       Cys Val Pro Ala Gly Phe Ala Met Leu Lys Cys Asn Asn Lys Thr
 676   TGT GTC CCG GCT GGG TTT GCG ATG CTA AAG TGT AAC AAT AAG ACA
       Phe Asn Gly Ser Gly Pro Cys Thr Asn Val Ser Thr Val Gln Cys
 721   TTC AAT GGA TCA GGA CCA TGC ACA AAT GTC AGC ACA GTA CAA TGT
       Thr His Gly Ile Arg Pro Val Val Ser Thr Gln Leu Leu Leu Asn
 766   ACA CAT GGA ATT AGG CCA GTG GTG TCA ACT CAA CTG CTG TTA AAT
       Gly Ser Leu Ala Glu Glu Asp Ile Val Ile Arg Ser Glu Asn Phe
 811   GGC AGT CTA GCA GAA GAA GAC ATA GTA ATT AGA TCT GAA AAT TTC
       Thr Asp Asn Ala Lys Thr Ile Ile Val Gln Leu Asn Glu Ser Val
 856   ACA GAC AAT GCT AAA ACC ATA ATA GTA CAG CTA AAT GAA TCT GTA
       Val Ile Asn Cys Thr Arg Pro Asn Asn Asn Thr Arg Arg Arg Leu
 901   GTA ATT AAT TGT ACA AGA CCC AAC AAC AAT ACA AGA AGA AGG TTA
       Ser Ile Gly Pro Gly Arg Ala Phe Tyr Ala Arg Arg Asn Ile Ile
 946   TCT ATA GGA CCA GGG AGA GCA TTT TAT GCA AGA AGA AAC ATA ATA
       Gly Asp Ile Arg Gln Ala His Cys Asn Ile Ser Arg Ala Lys Trp
 991   GGA GAT ATA AGA CAA GCA CAT TGT AAC ATT AGT AGA GCA AAA TGG
       Asn Asn Thr Leu Gln Gln Ile Val Ile Lys Leu Arg Glu Lys Phe
1036   AAT AAC ACT TTA CAA CAG ATA GTT ATA AAA TTA AGA GAA AAA TTT
       Arg Asn Lys Thr Ile Ala Phe Asn Gln Ser Ser Gly Gly Asp Pro
1081   AGG AAT AAA ACA ATA GCC TTT AAT CAA TCC TCA GGA GGG GAC CCA
       Glu Ile Val Met His Ser Phe Asn Cys Gly Gly Glu Phe Phe Tyr
1126   GAA ATT GTA ATG CAC AGT TTT AAT TGT GGA GGG GAA TTC TTC TAC
       Cys Asn Thr Ala Gln Leu Phe Asn Ser Thr Trp Asn Val Thr Gly
1171   TGT AAT ACA GCA CAA CTG TTT AAT AGT ACT TGG AAT GTT ACT GGA
```

Figure 3B (Continued).
Sequence and translation of two cDNAs encoding HIV gp120-CD154 short form extracellular domain fusion proteins.

```
        Gly Thr Asn Gly Thr Glu Gly Asn Asp Ile Ile Thr Leu Gln Cys
1216    GGG ACA AAT GGC ACT GAA GGA AAT GAC ATA ATC ACA CTC CAA TGC
        Arg Ile Lys Gln Ile Ile Asn Met Trp Gln Lys Val Gly Lys Ala
1261    AGA ATA AAA CAA ATT ATA AAT ATG TGG CAG AAA GTA GGA AAA GCA
        Met Tyr Ala Pro Pro Ile Thr Gly Gln Ile Arg Cys Ser Ser Asn
1306    ATG TAT GCC CCT CCC ATC ACA GGA CAA ATT AGA TGT TCA TCA AAT
        Ile Thr Gly Leu Leu Leu Thr Arg Asp Gly Gly Asn Ser Thr Glu
1351    ATT ACA GGG CTG CTA CTA ACA AGA GAT GGA GGT AAT AGT ACT GAG
                    BglII
                    ~~~~~~~~
        Thr Glu Thr Glu Ile Phe Arg Pro Gly Gly Gly Asp Met Arg Asp
1396    ACT GAG ACT GAG ATC TTC AGA CCT GGA GGA GGA GAT ATG AGG GAC
        Asn Trp Arg Ser Glu Leu Tyr Lys Tyr Lys Val Val Arg Ile Glu
1441    AAT TGG AGA AGT GAA TTA TAT AAA TAT AAA GTA GTA AGA ATT GAA
        Pro Ile Gly Val Ala Pro Thr Arg Ala Lys Arg Arg Thr Val Gln
1486    CCA ATA GGA GTA GCA CCC ACC AGG GCA AAG AGA AGA ACA GTG CAA
        Arg Glu Lys Arg
1531    AGA GAA AAA AGA

        (Gly4Ser)3 linker                                   BamHI
1543    Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Asp Pro
        GGG GGA GGC GGT TCA GGA GGT GGA GGT TCT GGA GGT GGC GGA TCG GAT CCA
        OR ProAspPro linker
          BamHI
1543    Pro Asp Pro
        CCG GAT CCA

        CD154 SHORT FORM Extracellular Domain
1594GS  Glu Asn Ser Phe Glu Met Gln Lys
1552PDP GAA AAC AGC TTT GAA ATG CAA AAA
1618GS  Gly Asp Gln Asn Pro Gln Ile Ala Ala His Val Ile Ser Glu Ala
1576PDP GGT GAT CAG AAT CCT CAA ATT GCG GCA CAT GTC ATA AGT GAG GCC
1663GS  Ser Ser Lys Thr Thr Ser Val Leu Gln Trp Ala Glu Lys Gly Tyr
1621PDP AGC AGT AAA ACA ACA TCT GTG TTA CAG TGG GCT GAA AAA GGA TAC
1708GS  Tyr Thr Met Ser Asn Asn Leu Val Thr Leu Glu Asn Gly Lys Gln
1666PDP TAC ACC ATG AGC AAC AAC TTG GTA ACC CTG GAA AAT GGG AAA CAG
1753GS  Leu Thr Val Lys Arg Gln Gly Leu Tyr Tyr Ile Tyr Ala Gln Val
1711PDP CTG ACC GTT AAA AGA CAA GGA CTC TAT TAT ATC TAT GCC CAA GTC
1798GS  Thr Phe Cys Ser Asn Arg Glu Ala Ser Ser Gln Ala Pro Phe Ile
1756PDP ACC TTC TGT TCC AAT CGG GAA GCT TCG AGT CAA GCT CCA TTT ATA
1843GS  Ala Ser Leu Cys Leu Lys Ser Pro Gly Arg Phe Glu Arg Ile Leu
1801PDP GCC AGC CTC TGC CTA AAG TCC CCC GGT AGA TTC GAG AGA ATC TTA
1888GS  Leu Arg Ala Ala Asn Thr His Ser Ser Ala Lys Pro Cys Gly Gln
1846PDP CTC AGA GCT GCA AAT ACC CAC AGT TCC GCC AAA CCT TGC GGG CAA
1933GS  Gln Ser Ile His Leu Gly Gly Val Phe Glu Leu Gln Pro Gly Ala
1891PDP CAA TCC ATT CAC TTG GGA GGA GTA TTT GAA TTG CAA CCA GGT GCT
1978GS  Ser Val Phe Val Asn Val Thr Asp Pro Ser Gln Val Ser His Gly
1936PDP TCG GTG TTT GTC AAT GTG ACT GAT CCA AGC CAA GTG AGC CAT GGC
                                                        XbaI
                                                        ~~~
2023GS  Thr Gly Phe Thr Ser Phe Gly Leu Leu Lys Leu Glu *** *** Ser
1981PDP ACT GGC TTC ACG TCC TTT GGC TTA CTC AAA CTC GAG TGA TAA TCT
        XbaI
        ~~~
2068GS  Arg
2026PDP AGA
```